Nov. 21, 1944. H. ADAMSON 2,363,219

AMMUNITION CHUTE

Filed July 11, 1941

FIG. 1

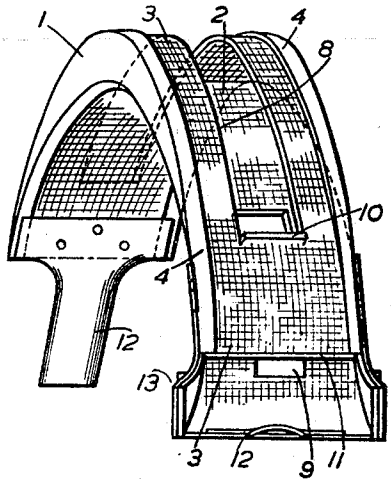


FIG. 2

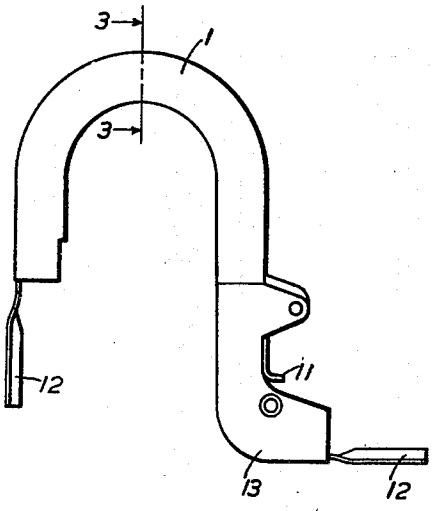


FIG. 3

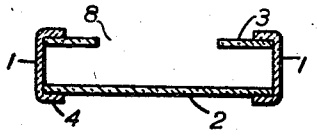


FIG. 4

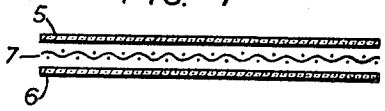


FIG. 5



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AMMUNITION CHUTE

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In Great Britain June 25, 1940

5 Claims. (Cl. 193—2)

This invention relates to articles made of sheet material, and in particular to cartridge chutes or guides for machine-guns. These chutes direct the "belt" of cartridges from the box or compartment in which it is folded and then to the breech of the gun, the structure being in the form of an arched channel through which the belt must slide freely.

According to the invention, the inner and outer walls are formed of (internally) reinforced plastic sheet material and the end walls of plastic sheet material autogenously secured to the edges of the inner and outer walls, as, for instance, by the use of a cement containing a solvent for the plastic material. The inner and outer walls having a width corresponding to the width of the belt and the space between them corresponding to the thickness of the loaded belt, the reinforced structure of the walls imparts such rigidity to the section of the channel that long slots can be formed in the walls to facilitate pushing the end of the belt through the curve of the arch without the need of stiffening means such as transverse tie-rods. This rigidity is added to by the autogenous union between the walls and the ends of the channel, the plastic arch being virtually a unitary member, because the whole length of each joint can be cemented.

The assembly of walls and ends can be very readily effected, even when the arch is skewed, i. e. when the inlet and outlet ends of the channel are not in line with each other. The several pieces of sheet material can be easily shaped to the curved and skewed form because of their plastic nature, and yet their complicated lines of junction offer no difficulty to the secure attachment of the pieces to each other, because of the ability of the material to be cemented. In this respect, the use of plastic material offers considerable advantage over sheet metal, the union of which by spot-welding or other methods usual with such material is difficult to accomplish satisfactorily. At the same time, the low specific gravity of plastics accords with the general desirability of reducing the weight of machine-guns as far as possible, particularly when they form part of the armament of aircraft.

Cellulose acetate is a cellulose ester particularly suitable as the basis of the plastic material from which the arch is formed, especially where extremes of temperature are met. For example, in military aircraft, the material may have to withstand temperatures well below freezing (particularly in high altitude flight) and also the high temperature arising from the friction occasioned by pulling the belt through the chute. Cellulose acetate sheeting gives very satisfactory service under such conditions. Other materials may, however, be used, for example, other cellulose esters such as cellulose acetate-butyrate and cellulose acetate-propionate, relatively high-melting synthetic resins which are polymerisation products of substances containing the vinyl radical, e. g. polymethyl methacrylate, and polyamides formed, for example, by the condensation of dicarboxylic acids with diamines.

The reinforcement of the inner and outer walls of the channel advantageously consists of wire mesh embedded in the plastic sheet. Tinned or galvanised steel wire mesh thus embedded does not deteriorate, or impair the quality of transparent sheet. The embedding may be effected by hot-pressing sheets of the plastic material on to interposed sheets of the wire mesh. The composite sheets may then be cut to shape and bent over curved moulds, the bending being effected hot so that after cooling the material sets to the required form.

The end walls of the channel are preferably formed of U-section material, which, without reinforcement, is sufficiently stiff to make the channel rigid when cemented to the inner and outer walls. The two lengths forming the end walls can be shaped hot to follow the edges of the shaped inner and outer walls, and the latter can then be slipped inside the flanges of the U-sections ready for cementing.

Plastic sheet of $\frac{1}{16}$-inch thickness is suitable for the U-sections, and two sheets of similar thickness, say 0.040-inch, may be pressed on to a sheet of wire mesh to form the material for the inner and outer walls. If the latter is transparent, it facilitates the operation of threading the belt through the channel.

It is found that the surface of the composite sheet has slight ridges imparted by the pressing of the plastic sheets on to the wire mesh, and these ridges on the inner surfaces of the channel much reduce the pull necessary to draw the belt through the channel. The ridges may be enhanced by rubbing the surface of the sheet when hot, e. g. with a flannel.

The wire mesh is also useful in maintaining the dimensions and shape of the chute at different temperatures, and in providing for the secure attachment of metal ends to the channel by means of rivets.

One form of chute according to the invention

will now be described in greater detail with reference to the accompanying drawing, in which

Fig. 1 is a front elevation;

Fig. 2 a side elevation;

Fig. 3 a part section on the line 3—3 of Fig. 2; and

Figs. 4 and 5 are diagrammatic sections illustrating the construction of the reinforced material used in the construction of the chute.

The chute is generally in the form of a skew arch, the main body being composed of two U-section members 1 of black cellulose acetate each bent to the form of an arch and two arched sheets of reinforced transparent cellulose acetate 2, 3 having their edges lying within and overlapped by the flanges 4 of the members 1. The members 1 are $\frac{1}{16}$-inch thick. The sheets 2, 3 are formed of two layers 5, 6 of transparent cellulose acetate of 0.040-inch thickness hot-pressed on to an intermediate sheet 7 of square mesh fabric of tinned or galvanised steel wire of about $\frac{1}{8}$-inch mesh as shown in Figs. 4 and 5. The sheets 2, 3 are secured to the U-section members 1 by means of an adhesive which may be composed of acetone 85%, benzyl alcohol 10%, and ethyl lactate 5%. This produces a substantially autogenous union between the four members, and produces a rigid section through which a machine-gun belt may be smoothly drawn.

In the member 3 a long slot 8 is cut extending over the top of the arch and a similar shorter slot 9 is formed in the member 2. As shown at 10 the material at the end of the slot may be turned slightly outwards and the end of the sheet 3 may also be turned outwards as shown at 11. At the ends of the arch metal guides 12 and wings 13 for the attachment of the chute to a machine-gun are mainly secured by rivets, the reinforcing wire mesh enabling these attachments to be fastened very securely to the cellulose acetate material of the chute proper.

The slots 8, 9 enable a belt to be easily fed by hand round the arch, but although the slot 8 extends over the whole crown of the arch and substantially down each side, the rigidity of the sheet 3 in which the slot is cut avoids undue weakening of the arch, and no additional tie-pieces, such as would interfere with the manual feeding of the belt, need be provided between the members 1.

Having described my invention, what I desire to secure by Letters Patent is:

1. Machine-gun belt chute comprising an arched channel having inner and outer walls formed of reinforced plastic sheet material and having end walls formed of plastic sheet material autogenously secured to the inner edges of said inner and outer walls, the reinforcement of said inner and outer walls being contained wholly within the plastic sheet material of which said walls are formed and being of such rigidity as to impart rigidity to the chute as a whole.

2. Machine-gun belt chute comprising an arched channel, the inner and outer walls of which are formed of plastic sheet material having wire mesh embedded therein and the end walls of plastic material autogenously secured to the edges of said inner and outer walls, said wire mesh imparting slight ridges to the inner surfaces of the channel.

3. Machine-gun belt chute comprising an arched channel, the inner and outer walls of which are formed of transparent plastic sheet material having a basis of cellulose acetate and having wire mesh embedded therein and the end walls of plastic sheet material autogenously secured to the edges of the inner and outer walls, said wire mesh imparting slight ridges to the inner surfaces of the channel.

4. Machine-gun belt chute comprising an arched channel, the inner and outer walls of which are formed of transparent plastic sheet material having wire mesh embedded therein and having openings therein and the end walls of plastic sheet material autogenously secured to the edges of the inner and outer walls, said wire mesh imparting slight ridges to the inner surfaces of the channel.

5. Machine-gun belt chute comprising an arched channel having inner and outer walls formed of reinforced cellulose acetate sheet material and having end walls formed of cellulose acetate sheet material autogenously secured to the inner edges of said inner and outer walls, the reinforcement of said inner and outer walls being contained wholly within the cellulose acetate sheet material of which said walls are formed and being of such rigidity as to impart rigidity to the chute as a whole.

HENRY ADAMSON.